

# CLAIMS

What is claimed is :

SUB

1 A<sup>5</sup> 1.  
2 steps of:

A method for estimating a channel, the method comprising the

3 calculating a least square channel estimate based on a  
4 training sequence;

5 calculating an interpolation coefficient, wherein said  
6 interpolation coefficient is independent from the statistics  
7 of the channel;and

8 estimating the channel based on said interpolation  
9 coefficient and said least square channel estimate.

1 2. The method of claim 1, wherein the step of calculating an  
2 interpolation coefficient comprises the step of calculating the maximum  
3 number of resolvable multiple paths on the channel.

1 3. The method of claim 2, wherein the step of calculating an  
2 interpolation coefficient further comprises the step of constructing a  
3 receiver multipath power profile of the channel.

1 4. The method of claim 3, wherein the step of calculating an  
2 interpolation coefficient further comprises the step of performing a fast  
3 fourier transform on said multipath power profile.

1 5. The method in claim 4, wherein the step of calculating an  
2 interpolation coefficient further comprises the step of determining an  
3 interpolation matrix by constructing a teoplitz of the result of the step of  
4 performing a fast fourier transform.

1 6. The method in claim 5, wherein the step of calculating an  
2 interpolation coefficient further comprises multiplying said interpolation  
3 matrix by said least square channel estimate.

1        7. An apparatus for estimating a channel, the apparatus  
2 comprising:

3                an LS estimator for calculating a least square channel  
4 estimate based on a training sequence;

5                a coefficient interpolator coupled to said LS estimator,  
6 said coefficient interpolator for calculating an  
7 interpolation coefficient, wherein said interpolation  
8 coefficient is independent from the statistics of the  
9 channel; and

10               a channel estimator coupled to said coefficient  
11 interpolator, said channel estimator for estimating the  
12 channel based on said interpolation coefficient and said  
13 least square channel estimate.

1               8. The apparatus of claim 7 wherein said coefficient interpolator  
2 further calculates the maximum number of resolvable paths on the channel  
3 for use in calculating, said interpolation coefficient

1               9. The apparatus of claim 8, wherein said coefficient interpolator  
2 constructs a receiver multipath power profile of the channel for use in  
3 calculating said interpolation coefficient.

1               10. The apparatus of claim 9, wherein said coefficient interpolator  
2 further performs a fast fourier transform on said multipath power profile to  
3 generate a result for use in calculating said interpolation coefficient.

1               11. The apparatus of claim 10, wherein said coefficient  
2 interpolator further constructs a teoplitz matrix of the result of said fast  
3 fourier transform to generate an interpolation matrix.

1               12. The apparatus of claim 11, wherein said coefficient  
2 interpolator further multiplies said interpolation matrix by said least square  
3 estimate calculated in said LS estimator to estimate the channel.

1 13. A method for estimating at least one channel, said method  
2 comprising the steps of:

3 determining a receiver multipath profile for the at least  
4 one channel; and  
5 calculating an interpolator coefficient based on said  
6 receiver multipath profile.

1 14. The method of claim 13, further comprising the steps of:

2 calculating a least square channel estimate for each at  
3 least one channel; and  
4 multiplying each least squares channel estimate for  
5 each at least one channel by said interpolation  
6 coefficient to estimate each at least one channel.

1 15. An apparatus for estimating at least one channel, said apparatus  
2 comprising:

3 a coefficient interpolator for determining a receiver  
4 multipath profile for the at least one channel and  
5 calculating an interpolation coefficient based on said  
6 receiver multipath profile.

1 16. The apparatus of claim 15, further comprising:

2 a least squares channel estimator for calculating a least  
3 squares channel estimate for each at least one channel;  
4 and

5 a channel estimator coupled to said least squares  
6 estimator and said coefficient interpolator, said channel  
7 estimator for multiplying each least squares channel  
8 estimate for each at least one channel by said  
9 interpolation coefficient to estimate each at least one  
10 channel.

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~~17.~~ An OFDM apparatus comprising:

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means for storing a receiver multipath power profile;

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and

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means for calculating an interpolator coefficient based

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on said receiver multipath power profile.

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18. The apparatus in claim 16, further comprising:

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a buffer for storing a training sequence;

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means for calculating a least square channel estimate

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from said stored training sequence; and

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means for combining said least square channel

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estimate with said interpolator coefficient.

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